SMP Tiltrotator User Manual

ENGLISH

SMP Parts AB

Swingotilt

ST6, ST10, ST12, ST15,
ST22, ST28

Congratulations on your SMP purchase!

Carefully study this user manual before using the product.
The manual explains the safety aspects for using this product and how to get the most out if it to maximize the products life cycle.
Take care of your SMP product and it will take care of you!

Welcome to SMP Parts AB.
Do not hesitate to contact us for further information.
www.smpparts.com

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INTRODUCTION

About This Manual

This user manual is intended to be used together with the SMP Tiltrotator during installation, operation and regular maintenance.

This manual is a guide of how to use and maintain the tiltrotator in a correct way. SMP reserves the right to change the contents of this manual at any time and without prior notice. This user manual can be ordered at SMP Parts.

The operator of the equipment must carefully study and make sure to fully understand this manual and its contents before using the equipment. The safety information given in this manual is only relevant to the SMP Tiltrotator independent of the carrier machine and tools.

This user manual is an original instruction according to the machinery directive: 2006/42/EG.

General

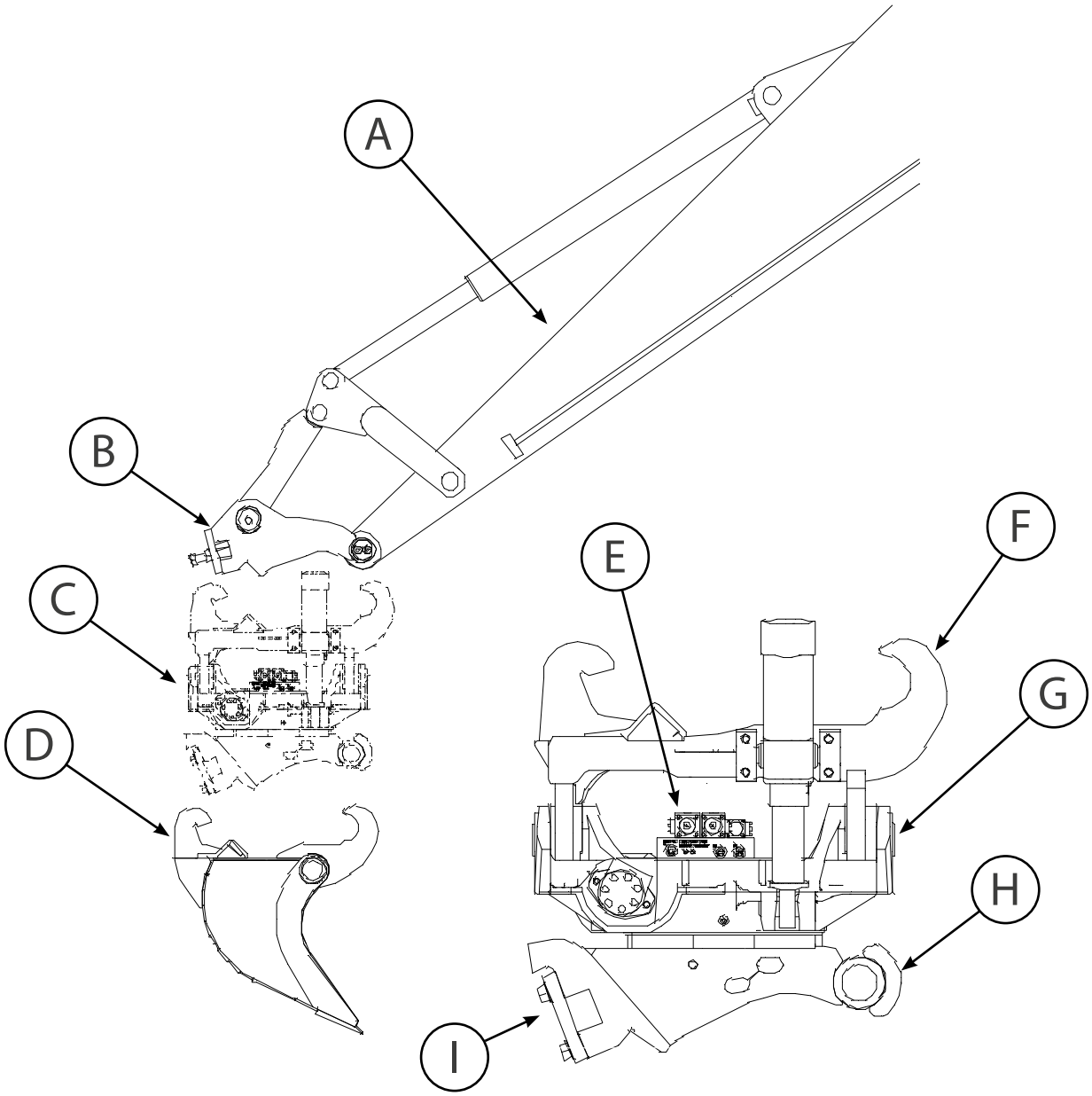
The SMP Tiltrotator is installed into the excavator digger arm to enable tilting and rotation of a bucket or tool. The tools attached to the tiltrotator should be tools that are intended for use during work with an excavator.

The tiltrotator is not designed for and should not be used during a task that requires high torque, such as ploughing for cables or with a ripper.

To minimize the risk of personal injuries and damage to equipment and before using the equipment, make sure to read, understand and pay attention to all warnings given in signs and instructions on the equipment and in the instruction manuals.

Always make sure that there are no unauthorized persons located within the designated working area of the excavator.

Before using the equipment, make sure that the tiltrotator and equipment is completely fastened, both to the excavator and the tiltrotator quick coupler.

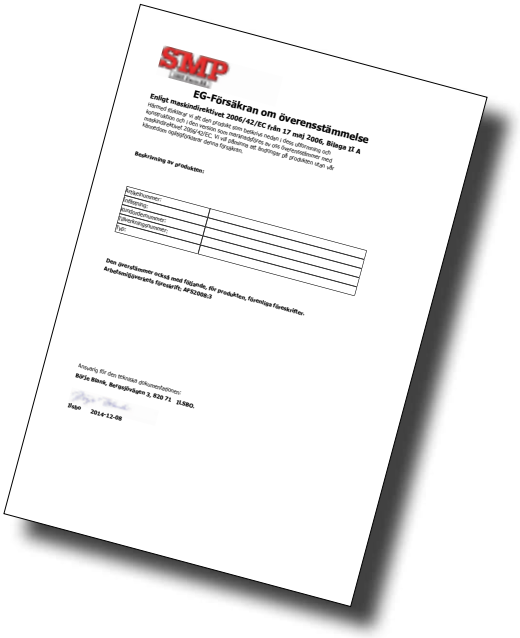


Pos	Description
A	Dipper
B	Quick coupler
C	Tiltrotator
D	Bucket/Tool
E	Hydraulic control valves
F	Attachment
G	Rotator housing
H	Quick coupler
I	Grapple attachment bracket

INTRODUCTION

Declaration of Conformity

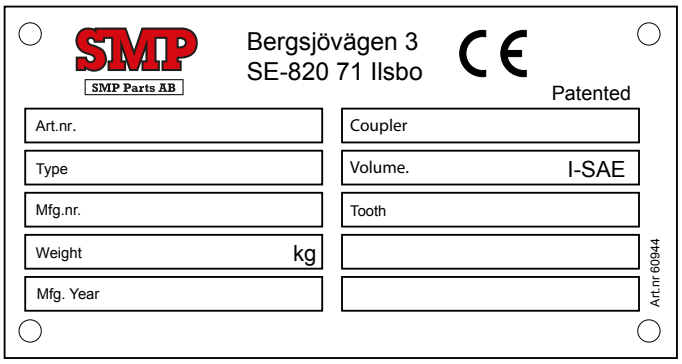
SMP Parts develop and manfacture all products in accordance with european legislation and the machinery directive 2006/42/EG. Together with the delivered products there is also a CE certificate that guarantees that the equipment is manufactured according to legislation.


EG-Försäkran om överensstämmelse

Identification Plate

The identification plate gives information about the model designation, serial number and manufacturing year. There is also a CE-logotype on the plate indicating that the product fulfills the machinery directive.

Fill the fields with the information copied from the manufacturing plate on the tiltrotator.



Safety and Warnings

This chapter describes safety related information that needs to be taken into consideration before, during and after using the equipment.

DANGER, WARNING, CAUTION and Note statements are used throughout this manual to emphasize important and critical information. You must read these statements to help ensure safety and to prevent damage to the product. The statements are defined below.

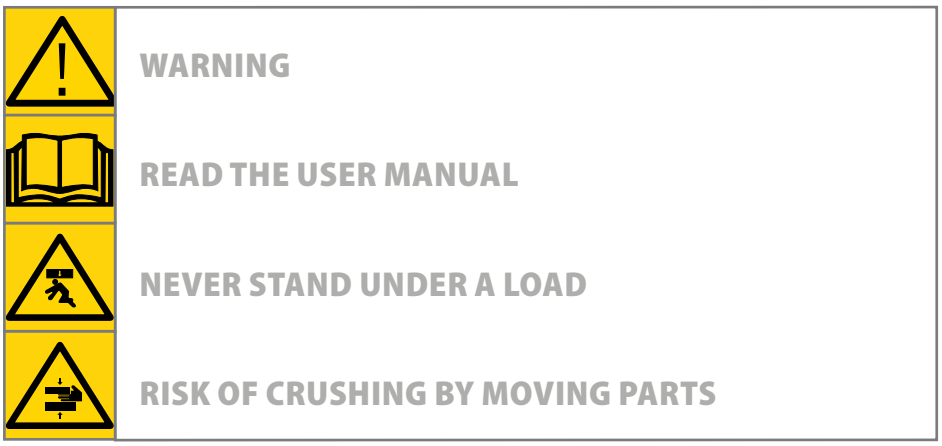
DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

Note: A note statement is used to notify people of installation, operation or maintenance information that is important, but not hazard-related.

General Warning Signs on Machinery Equipment



SAFETY

⚠ DANGER!

Never stand under a load! Always pay attention to the machines working area. Unauthorized persons are not allowed to enter the working area of the machine during operation. Always ensure that the machine is completely stopped during maintenance and repairs.

⚠ WARNING!

Do not install the tiltrotator before you have read and understood the instructions given in the user manual.

⚠ WARNING!

Incorrect installation can affect the safety. If there are any uncertainties, contact your local dealer or SMP Parts.

⚠ WARNING!

Make sure that the hydraulic system does not contain any pressure before maintenance or repair work. The hydraulic oil is under high pressure and can penetrate your skin causing serious injury.

⚠ WARNING!

Never use your hands when checking for a leakage. The hydraulic oil is under high pressure and can penetrate your skin causing serious injury.

⚠ WARNING!

When the tiltrotator is being installed, the load tipping limit must be checked to prevent and minimize the risk of injury.

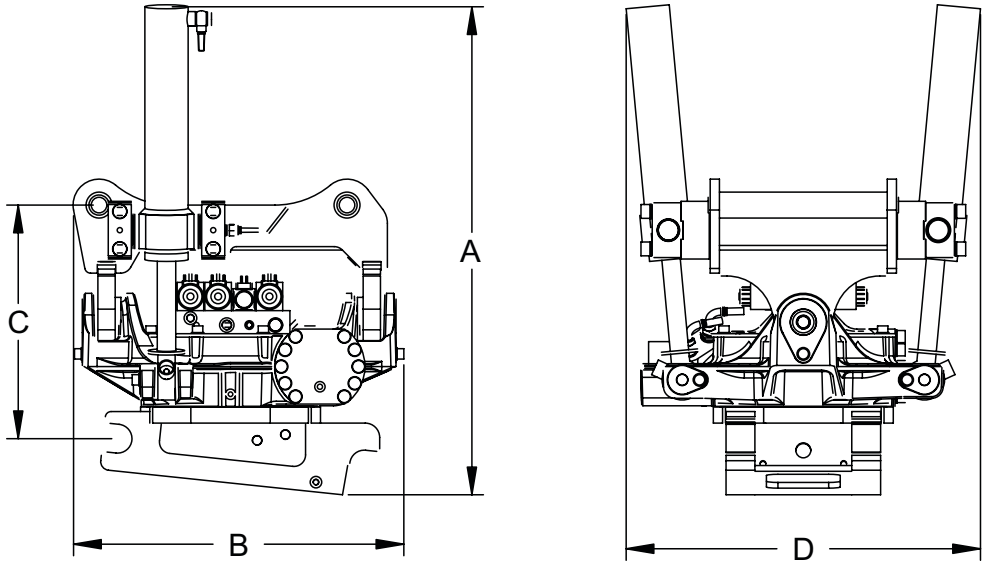
⚠ WARNING!

Never use equipment attached to a quick coupler if the locking mechanism is not in locked position and the bucket/tool is not completely secured.

⚠ WARNING!

Use protective clothing when working with the equipment.

Technical Data



Model		ST6	ST10	ST15	ST22	ST28
Weight	kg	>140	>260	>370	>550	>730
Height (A)	mm	720-740*	870-890*	906-1002*	1060-1130*	1080-1130*
Length (B)	mm	496*	590-640*	726-807*	910-1000*	920-1040*
Axle distance (C)	mm	345-375*	430-480*	465-560*	570-620*	570-670*
Width (D)	mm	415-470*	600	668-789*	830-850*	860-920*
Tilting angle	°	2 x 40°				
Rotation	°	Endless 360°				
Electrical system	V	12/24				
Oil flow min/max	L/min	30/70	30/60	40/80	40/80	50/100
Working pressure min/max	MPa	18/21	18 / 21	18/21	18/35	18/35
Tilting moment at 21 MPa	kNm	12,3	25,3	23,4/34,1**	52,2	52,9
Rotation speed	sec / rev	7	7	7	7	10

**Dimensions can vary depending on type of tilting cylinders and quick coupler*

***Tilting moment can vary depending on type of tilt cylinder*

CONTROL SYSTEM

Control System

The tiltrotator is equipped with different types of control systems and valves based on customer needs and the model of the tiltrotator.

Control Systems TS-TSXC
The tiltrotator is connected to the excavators double acting auxiliary hydraulics. The manoeuvring is performed via the excavators control system with joystick handle thumb rollers or rocker switch.

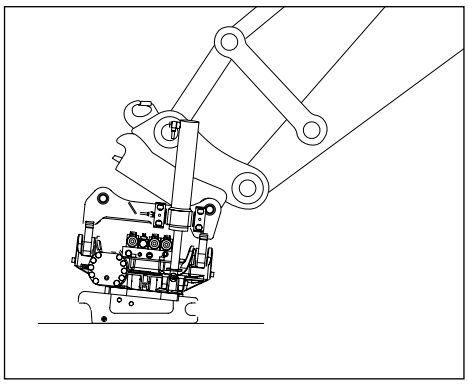
Control System TXXSC - TXXC - Tiltrotator with Grip Module
The tiltrotator is connected to the excavators double acting auxiliary hydraulics. The manoeuvring is performed via the excavators control system with joystick handle thumb rollers or rocker switch.

Control System P and PRO macs RT
The tiltrotator is connected to the excavators single acting auxiliary hydraulics and is operated with the control system provided by SMP. The tilt and rotor functions of the PRO system have proportionally controlled valves to enable exact precision during operation.

NOTE!
The quick coupler locking mechanism will only function properly with quick couplers provided by SMP. If any other type of quick coupler is to be installaed, contact SMP for information regarding functionality and how to install.

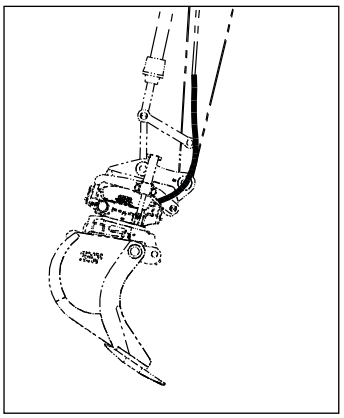
Installation

The tiltrotator can be installed either by attaching it to the excavator arm quick coupler, or be directly mounted onto the dipper arm.



Quick coupler attachment
To ensure correct installation, make sure that the tiltrotator is placed onto a flat surface without obstacles.

1. Attach the tiltrotator to the excavator quick coupler, lock the quick coupler according to the excavator manufacturer instructions. Carefully check that the tiltrotator is completely locked.
2. When the tiltrotator is securely locked, lift it slightly above the ground to release and pressure locked inside the hydraulics. Connect the hydraulic hoses and electric cables. Make sure that the cable and hose have suitable lengths for the installation.
3. When the tiltrotator is installed, check the functionality. Check if there is a risk of collision between the bucket/tool and machine.
4. Carry out a daily inspection before taking the equipment into use.



⚠ WARNING!

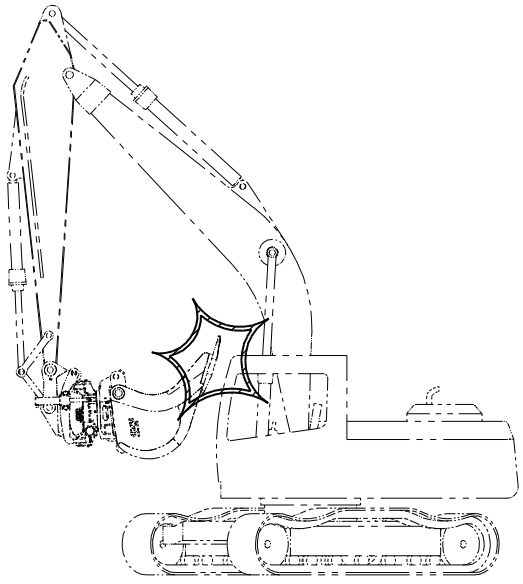
Do not install the tiltrotator before you have read and understood the instructions given in the user manual.

⚠ WARNING!

Incorrect installation can affect the safety. If there are any uncertainties, contact your local dealer or SMP Parts.

⚠ WARNING!

Make sure that the hydraulic system does not contain any pressure before demounting the pressure hoses to the locking function. Hydraulic oil under pressure can penetrate your skin and cause serious injury. Fit plugs onto the hoses to be able to operate the excavator arm during the installation.

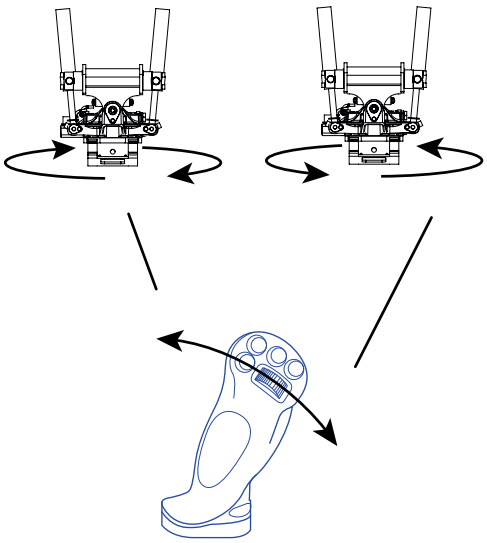


INSTALLATION

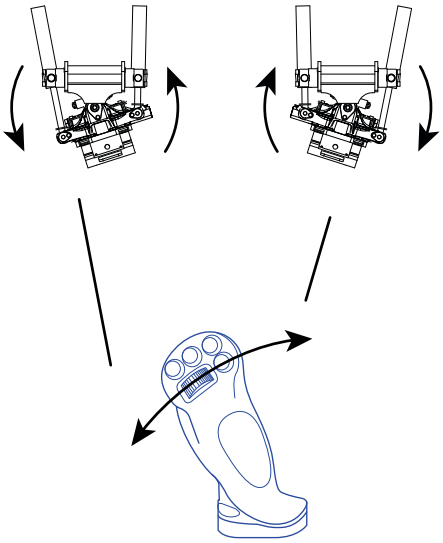
Functions

The Tiltrotator is activated either by a switch or a pedal inside the driver cab.

Manouvering the tiltrotator with thumb rollers in the joystick handles

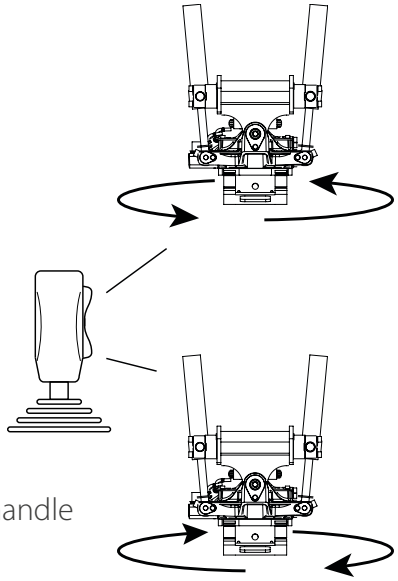


Left joystick handle

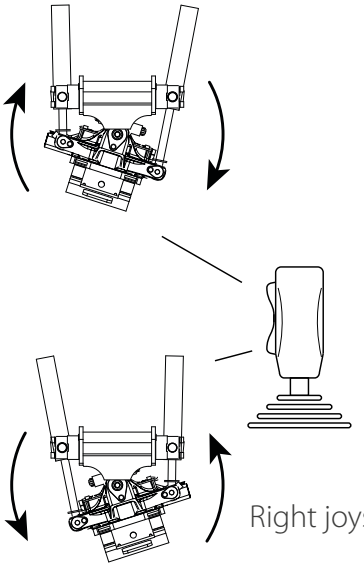


Right joystick handle

Manouvering the tiltrotator with rocker switches in the joystick handles



Left joystick handle



Right joystick handle

Installation of the Electrical and Hydraulic System

The Tiltrotator electrics and hydraulics are installed depending on the type of machine, equipment and control system. Always follow the machine manufacturers instructions and guidelines of how to install auxiliary equipment in a safe and correct way.

Connecting the Hydraulics

The hydraulic system is designed to work with a hydraulic pressure of 21 Mpa and a flow of 60 l/min.
The type, size and length of hydraulic hoses and couplings can differ depending on type of machine. Therefore it is sometimes neccesary to make new hoses locally. Ensure that the hydraulic hoses are the correct length to prevent damage which can be caused by stretching or crushing.

Make sure that the hydraulic hoses and nipples are fitted and tightened according to the supplier recommendations.

Connecting the Electrics

The electrical components are designed to function both with 12V or 24V.
Ensure that the cabling is the correct length to prevent damage which can be caused by stretching or crushing.

⚠ WARNING!

Always make sure to fuse up the power lead wire in case of a short circuit in the electrical system. An electrical short circuit can cause damage to the excavator electrical system, or in worst case cause a fire that could lead to serious injury or death.

INSTALLATION

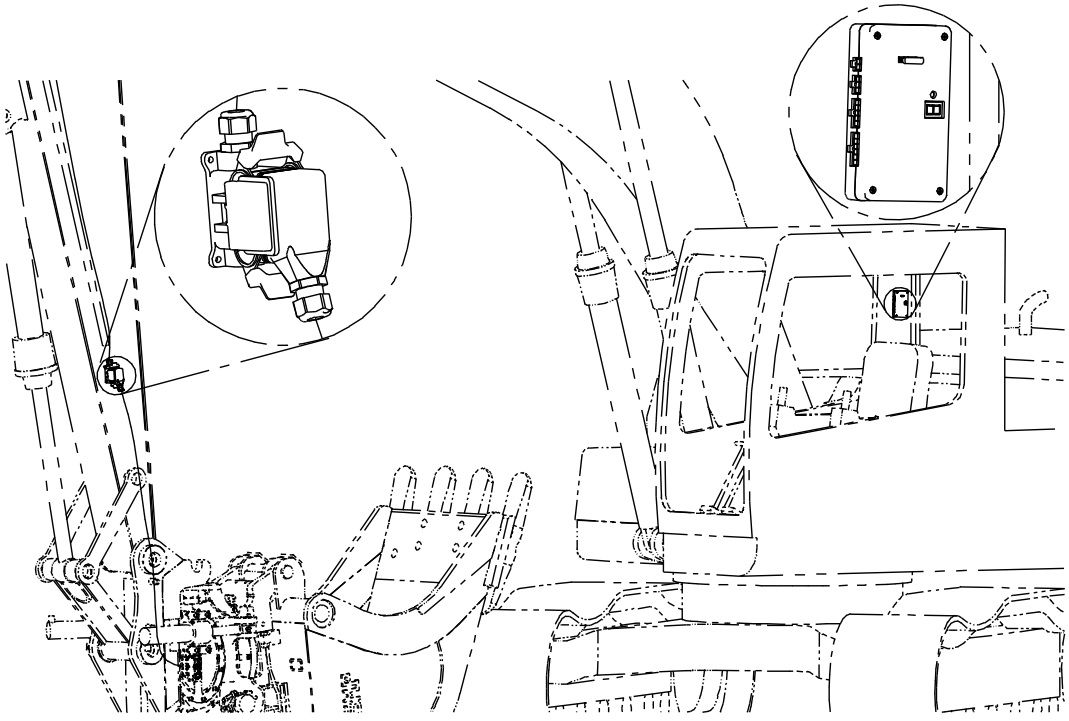
Installing The Control System

Connector on dipper arm

Install the connector on the left-hand side of the dipper arm, seen from the driver's seat. This enables the driver to have the best possible view of the cable and connector. Install the cable so that it follows the hydraulic hoses connected between the tiltrotator and the machine.

Driver's cab

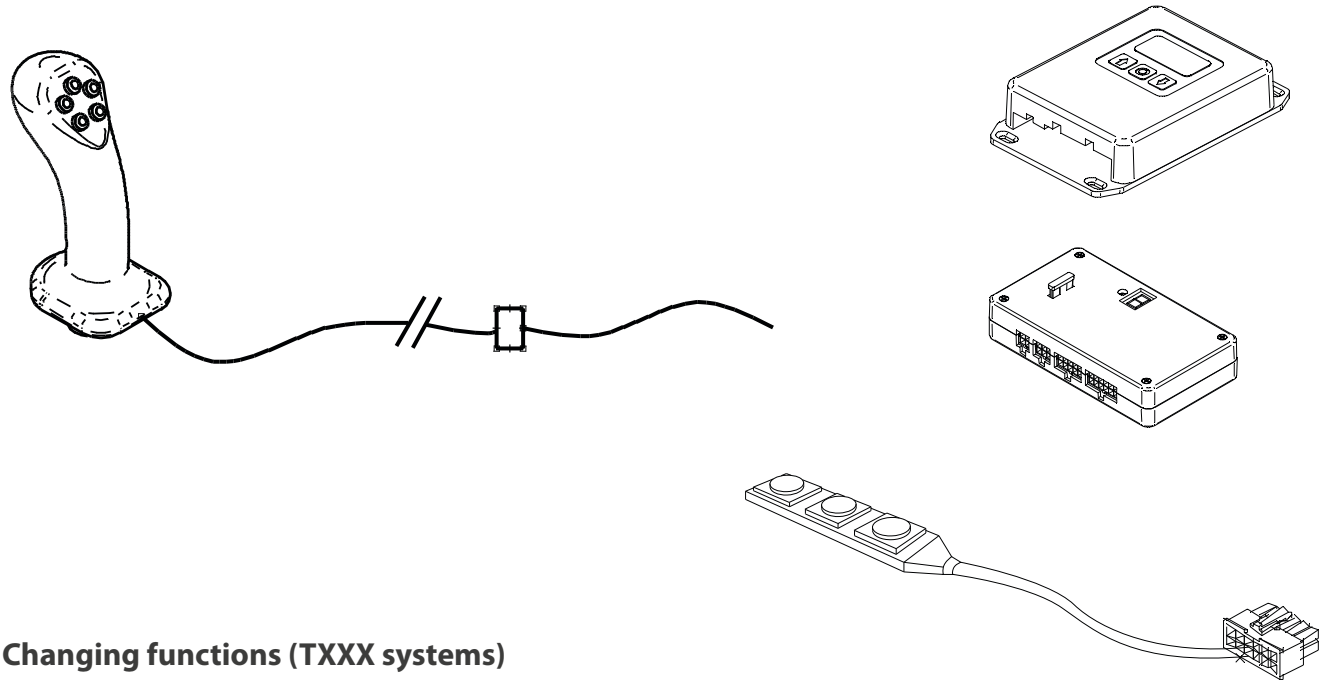
Install the control unit on the right-hand side inside the driver's cab, so that the driver can see if any error code is presented on the display. The control unit is the same type for both TXXX and P control systems. Read more information about the control unit in chapter: "*Installing control system P"*



Installing Control System TXXX

Lever

The system includes a push-button set. The cable can be connected to the existing lever instead of the push-button set. When replacing the lever and when there is no corresponding connector, cut the cable between the connector and lever. This is so that the machine can easily be reset to its original settings at a later date.



Changing functions (TXXX systems)

The easiest way to change the function is to swap the cables in the connector on the pin. When changing, enter the new configuration in the table below for future use.

Pin	Cable no.	Description	Modified configuration
1	1	Lock output 4	
2	2	Lock ground	
3	3	ground	
4	4	Output 1A	
5	5	Output 1B	
6	6	Output dump 1	
7	7	Output 2A*	

INSTALLATION

Installing Control System P

Function description

The control unit can drive 6+1 valves as well as 1 x DUMP. The DUMP signal is active when one of the other functions is activated. The DUMP function activates the auxiliary hydraulics on the excavator to distribute oil flow to the tiltrotator. The control unit is short-circuit protected and automatically reduces the current in the event of overload.

+12/24V

Power input from the excavator battery och ignition switch.

Switch

The switch connects inputs for quick coupling buttons and output signals for dump.
The dump signal is received as both supply voltage and ground.

Output

Output signals to valves on the tiltrotator.

Input

Input signals from function switches.

Jumper settings

Jumper INPUT is to select positive or negative control on the INPUT connector.
Jumper INP CHK is to activate fault control on in signals.
Activated error control disconnects all functions, if a function is activated with current on.
To resume, cancel and reset the current to the control unit.

Error messages/ fault-tracing

Short flash:

The error lamp flashes when a function is activated. This is completely normal.

Continuous light:

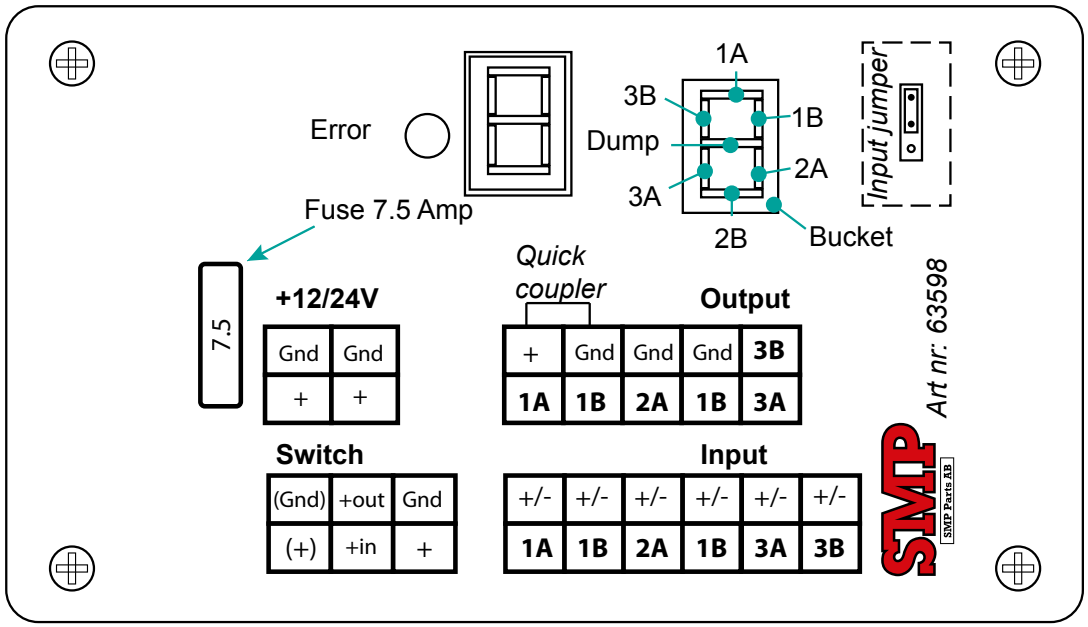
If the error lamp lights continuously when a function is activated, this output has a shortcircuit.

Continuous light when the quick coupling function is activated (Control system P only):

The error lamp lights continuously if one of the outputs is interrupted, i.e. there is no contact with the magnet coil on the valve.
The error lamp goes out when the interrupted output is activated. NOTE. If several outputs are interrupted, all outputs must be activated to extinguish the error lamp.

NOTE!

Starting the excavator with battery booster:
Always disconnect the control unit to protect it from over-voltage!



Connectors on the Control Unit

+12/24V Input
Power input from excavator battery and ignition switch

Pin	Description
Gnd	Ground
Gnd	Ground
+	+12/24V
+	+12/24V

Output
Output signals to valves on the tiltrotator

Pin	Description
+	Output signal to quick coupler
Gnd	Ground from quick coupler
1A, 1B, 2A, 2B, 3A, 3B	Output signal to corressponding input signal

Switch
The switch connects inputs for quick coupling buttons and output signals for dump. The dump signal is received as both supply voltage and ground.

Pin	Description
(Gnd)	Dump ground
(+)	Dump supply voltage
+out	Supply voltage to switch lock
+in	In signal to switch lock
Gnd	Ground to switch (lamp)
+	Supply voltage to switch (lamp)

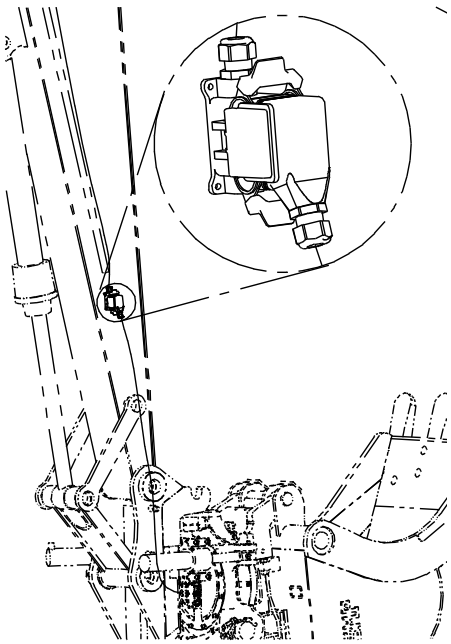
Input
Input signals from function switches

Pin	Description
+/-	Supply to buttons + or - depending on jumper setting
1A	Tilt left
1B	Tilt right
2A	Rotation left
2B	Rotation right
3A	Extra function left
3B	Extra function right

Connectors On Dipper Boom, Control System P

10 Slot connector

Pin	Cable no.	Description	Modified configuration
1	1	Output signal to quick coupler	Do not change
2	2	Ground from quick coupler	Do not change
3	3	Ground	Do not change
4	4	Ground	Do not change
5	5	Extra function right	
6	6	Tilt left	
7	7	Tilt right	
8	8	Rotation left	
9	9	Rotation right	
10	10	Extra function left	



Installing Control System PRO Macs ST

For installation instructions of the control system PRO, read separate manual.

Connectors On Dipper Boom, Control System PRO Macs ST

14 Slot connector

Pin	Cable no.	Description
1	1, 12	Ground, solenoid 1A, 1B
2	2	Solenoid 1A tilt left
3	3	Solenoid 1B tilt right
4	4, 13	Ground, solenoid 2A, 2B
5	5	Solenoid 2A rotation right
6	6	Solenoid 2B rotation left
7	7, 14	Ground, solenoid 3A, 3B
8	8	Solenoid 3A extra 1
9	9	Solenoid 3B extra 1
10	10	Ground from quick coupler
11	11	Output signal to quick coupler
12	15, 17	Ground, solenoid 5A, 5B
13	16	Solenoid 5A, Extra 2
14	18	Solenoid 5B, Extra 2

INSTALLATION

Pre Delivery Inspection

After the installation is completed:

1. Check the functionality of the tiltrotator.
2. Check for leakages on the hydraulic system.
3. Attach a bucket or a tool and operate the tiltrotator to its end positions.
4. Check and make sure that the tiltrotator, bucket or tool is perfectly secured and that no hoses or cables are stretched or crushed.
5. Grease according to lubrication chart.
6. Clean the equipment before delivery to end customer.
7. Fill in local after sales contact information on the back cover of this manual.
8. Copy the information from the manufacturing plate and fill in the corresponding fields on the manufacturing plate, illustrated on page 6 of this manual.
9. Place this manual together with other documentation in the carrier machine.

⚠ WARNING!

This manual only covers parts related to the tiltrotator and is a complement to the carrier vehicle user manual. Make sure to read and fully understand the instructions given for how to operate the carrier vehicle before taking this Tiltrotator into use.

⚠ WARNING!

Before taking the Tiltrotaror into use, make sure that you have read and fully understood the instructions of how to use and operate the tiltrotator.

⚠ DANGER!

Never stand under a load! Always pay attention to the machines working area. Unauthorized persons are not allowed to enter the working area of the machine during operation. Always ensure that the machine is completely stopped during maintenance and repairs.

⚠ WARNING!

Do not install the tiltrotator before you have read and understood the instructions given in the user manual.

⚠ WARNING!

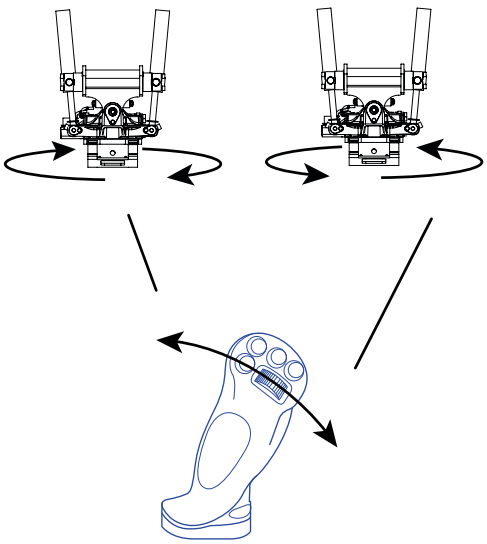
Never use equipment attached to a quick coupler if the locking mechanism is not in locked position.

OPERATION

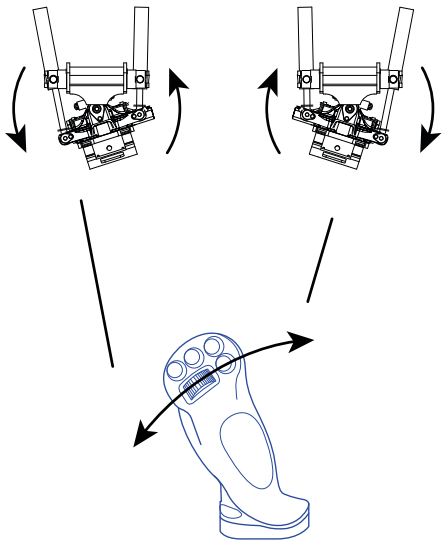
Functions

The Tiltrotator is activated either by a switch or a pedal inside the driver cab.

Manouvering the tiltrotator with thumb rollers in the joystick handles

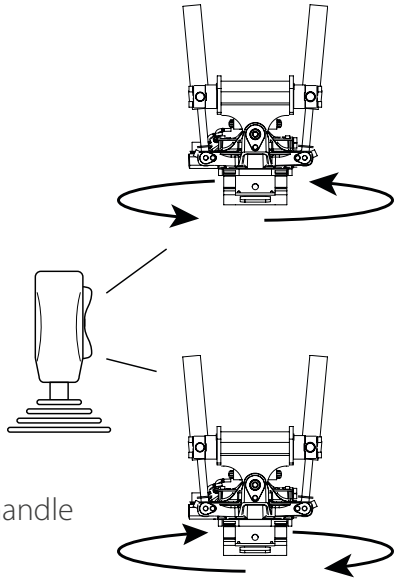


Left joystick handle

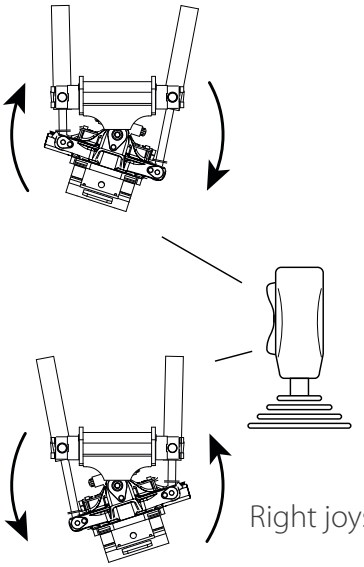


Right joystick handle

Manouvering the tiltrotator with rocker switches in the joystick handles



Left joystick handle



Right joystick handle

Troubleshooting

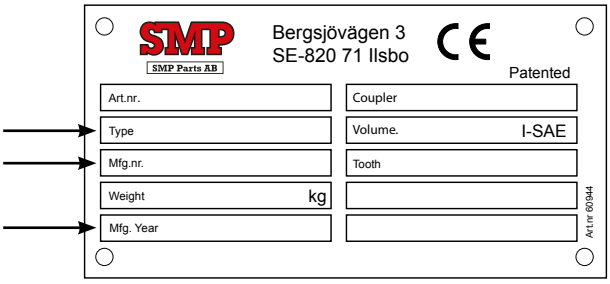
Insufficient functionality can depend on a number of reasons. This list explains some of the possible faults to check for.

- Check for blocking materials such as stones or debris that can block the mechanical functions of the tiltrotator.
- Check for mechanical damage.
- Check the functionality of the excatavor.
- Check for leakage
- Check fuses in case of an electrical short circuit

Make a judgement if the fault can be repaired by yourself or if a technician needs to repair the fault.
Contact your local aftersales contact person.

NOTE!

Please have your **Manufacturing Number, Type** and **Manufacturing Year** available when you contact SMP Parts, so that we can help you as quickly as possible. This information can be found on page 6 of this manual.



⚠ WARNING!

Do not carry out any repairs if you do not have the expertise or knowledge of how to perform the repair.

⚠ CAUTION!

Always use protective clothing when working with the equipment.

⚠ WARNING!

The machine must always be completely turned off during service and maintenance.

SERVICE AND MAINTENANCE

Service and Maintenance

To ensure a long life cycle and to get the most out of the products, regular service and maintenance is of high importance.

⚠ CAUTION!

Always use protective clothing when working with the equipment.

⚠ WARNING!

The machine must always be completely turned off during service and maintenance.

Daily Maintenance

- Operate the tiltrotator to check its functionality.
- Visually check shaft locking pins and nuts.
- Check for leakages in the hydraulic system.
- Check for cracks and damage.
- Check that the quick coupler is correctly fastened to both the excavator and the bucket.
- Clean the tiltrotator from dirt.
- Lubricate according to lubrication chart.
- Check for axial play, contact your SMP after sales contact person if needed.
- Check fastenings on shafts, tighten locking screws and nuts if needed.

Maintenance every 6 months or 500 operating hours (whichever comes first)

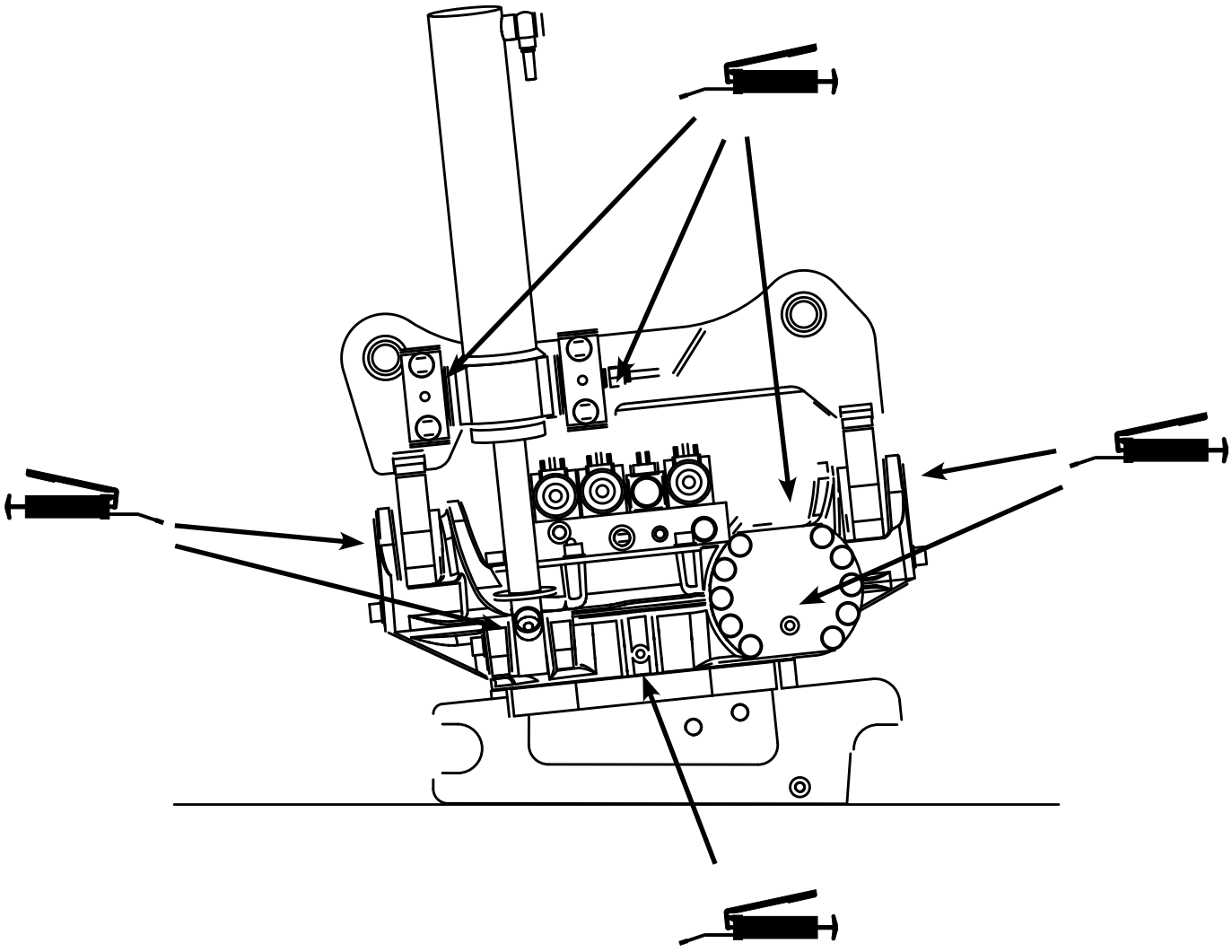
- Tightening of the tilt cylinder bracket clamp.
- Check and re-tighten screws on tilt cylinder shafts.

Annual Maintenance or 1000 operating hours (whichever comes first)

- Check and re-tighten screws on the swivel joint bolting (to be carried out by a SMP authorized workshop).

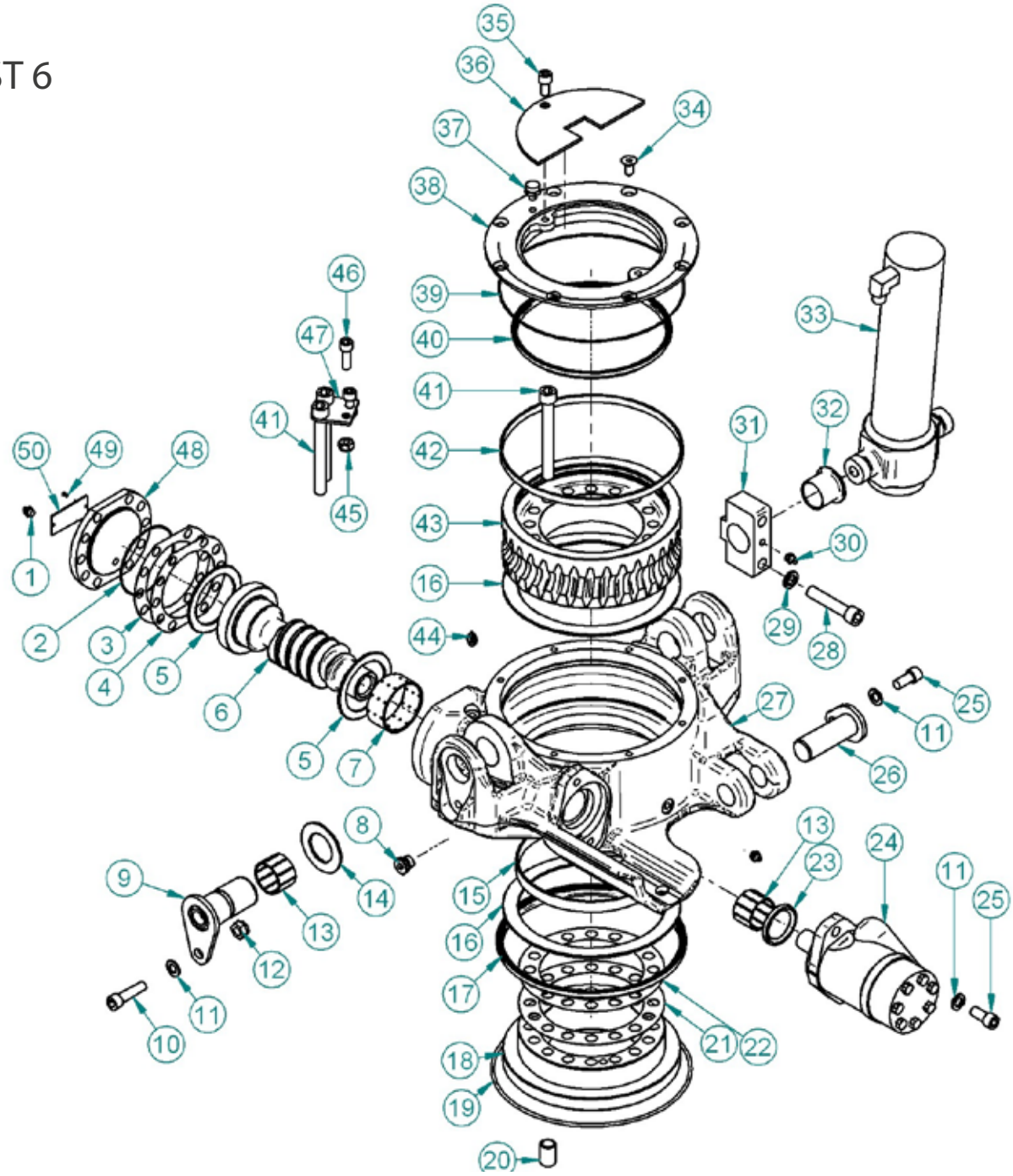
Lubrication Chart

Lubricate the tiltrotator with grease daily or after 8 working hours. Pump two to three times for each grease nipple. If a grease nipple does not work properly, replace the nipple and clean the groove.



SPARE PARTS

ST 6

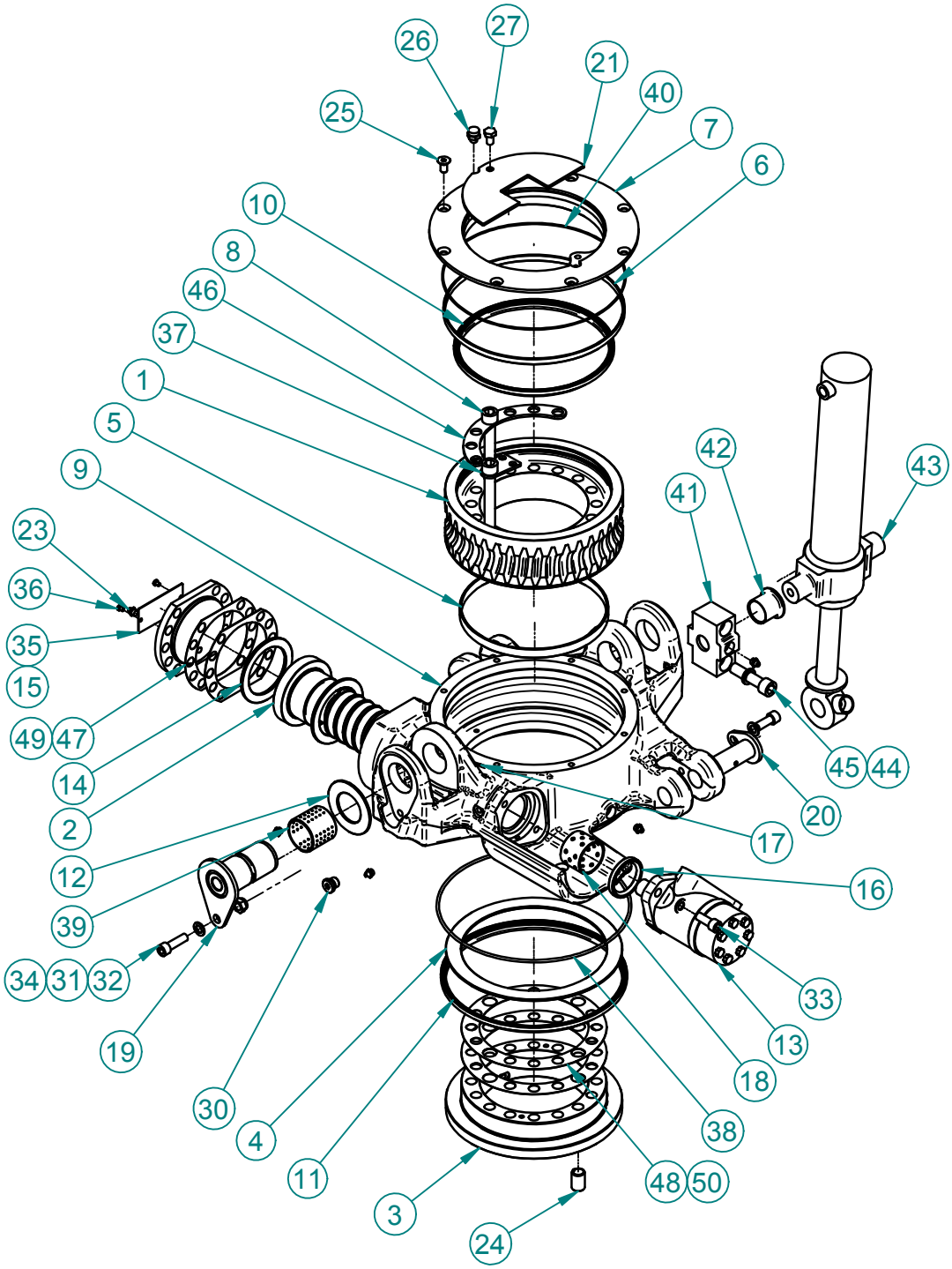


Pos.	Art.nr.	Description
1	60753	LUBRICATION NIPPLE R1/8"
2	61562	O-RING 85X2
3	63914	SHIMS T=0,2
4	61555	ST6 SHIMS T=0,5
5	63843	FRICTION PLATE 93/70x3
6	63838-B	WORM SCREW
7	63899	BUSHING WB702 65/70x30
8	60072	PIPE PLUG 3/8"

9	72165	TILT AXEL COMPL. ST6
10	60401	SCREW MC6S 12.9 M12X 45
11	60754	NORDLOCK WASHER M12
12	60084	SPLIT NUT LM6M M12 FZB
13	63882	BUSHING WB702 40/44x30
14	63881	SLIDING PLATE
15	63842	SLIDING RING 93x70x3
16	63840	FRICTION PLATE 225x186,5x3
17	63846	RELEASER DA17 225
18	63839-B	FRICTION PLATE ST6
19	63884	O-RING 246x4
20	63145	GUIDE PIN L 20x30
21	61554	SHIMS T=0,5
22	63913	SHIMS T=0,2
23	63883	CABLE GLAND 55x40x8
24	63221	HYDRAULIC MOTOR EPM-125-CUP
25	63222	SCREW 12.9 M12x25
26	57231	CYLINDER AXLE COMPL. ST9/14
27	63879-C	ROTATOR HOUSING ST6
28	60095	SCREW 12.9 M14x70
29	61295	NORDLOCK WASHER M14
30	60753	LUBRICATION NIPPLE 1/8”
31	72179	CAP CYL.MOUNT ST6
32	62080	BUSHING WB800 WF35/39/50x35
33	63893	CYLINDER 63/32x255 ST6
34	63896	SCREW 10.9 MF6S M10x20
35	60762	SCREW 8.8 M10x20
36	72164	COVER ST6
37	63992	BLEED NIPPLE M10X1
38	63844-B	COVER ST6
39	61561	O-RING 220x2
40	63845	RELEASER DA17 190
41	63895	SCREW MC6S 12.9 M14x120
42	63841	SLIDING RING 231x226x2,5
43	63837-B	STEERING WORM GEAR ST6
44	60302	LUBRICATION NIPPEL 1/8" 45GR
45	60141	SPLIT NUT LM6M M10 FZB
46	60367	SCREW 12.9 M10X30
47	72168	SWIVEL HOLDER ST6
48	63870-A	BEARING SUPPORT ST6
49	62837	RIVET
50	63188	EMBLEM

SPARE PARTS

ST 10

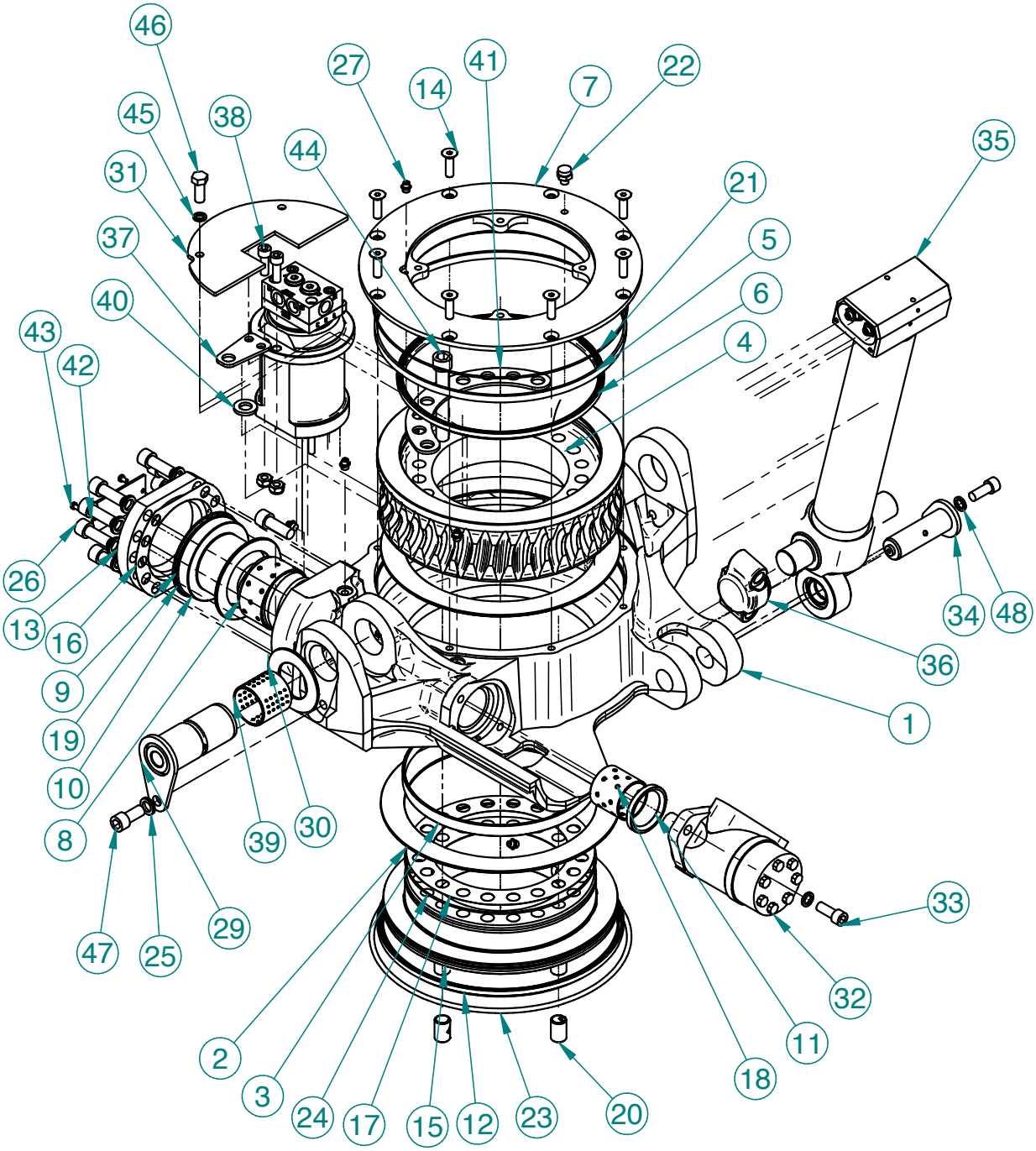


Pos.	Art.nr.	Description
1	61628-A	WORM WHEEL ST10
2	63290-C	WORM SCREW
3	61629-A	FRICTION PLATE ST10
4	61630	FRICTION PLATE 270/223X3
5	61631-A	SLIDING RING 227/222X16
6	61632-A	SLIDING RING 277/272X10
7	61633	COVER ST10

8	63055	SCREW MC6S 12.9 M16x140
9	61646-B	ROTATOR HOUSING ST10
10	61634	RELEASER DA17 410
11	61635	RELEASER DA17 270
12	61636	90/50,5x3
13	63221	HYDRAULIC MOTOR EPM-125-CUP
14	63334	FRICTION PLATE 118x81/4
15	58667-A	BEARING SUPPORT ST9/10
16	63148	CABLE GLAND 65x50x8
17	63335	BUSHING WB802 85/80x30
18	63147	BUSHING WB802 50/55x40
19	73061	TILT AXEL COMPL. ST10
20	57231-A	CYLINDER AXLE COMPL. ST6-10
21	73060	COVER PLATE
22*	61141	LUBRICATION NIPPLE M6
23	60753	LUBRICATION NIPPLE R1/8"
24	63145	GUIDE PIN L 20x30
25	63896	SCREW 10.9 MF6S M10x20
26	63992	BLEED NIPPLE M10X1
27	60928	SCREW M6S 8,8 M10x16 FZB
28*	61295	NORDLOCK WASHER M14
29*	60411	SCREW MC6S 10,9 M14x30 FZB
30	60072	PIPE PLUG 3/8"
31	60754	NORDLOCK WASHER M12
32	60734	SCREW MC6S 8,8 M12x 40 FZB
33	60763	SCREW MCGS 8,8 M12 x 30 FZB
34	60084	SPLIT NUT LM6M M12 FZB
35	63187	EMBLEM 95 x 45 GOLD
36	63191	SCREW MCS M5 x 6 BRASS
37	73282	SWIVEL HOLDER ST10
38	61715	O-RING 285x4
39	62955	50/55x50
40	61716	O-RING 274x2
41	73174	CYLINDER HOLDER
42	62080	BUSHING WB800 WF35/39/50x35
43	63265	CYLINDER 63/32
44	60749	NORDLOCK WASHER M16
45	61794	SCREW MC6S 12.9 M16x75
46	74092	WHASHER
47	63384	SHIM ST10 T=0,2
48	63385	SHIM 222/167X0,5
49	63386	SHIM T=0,5
50	63383	SHIM 222/167X0,2

SPARE PARTS

ST 12

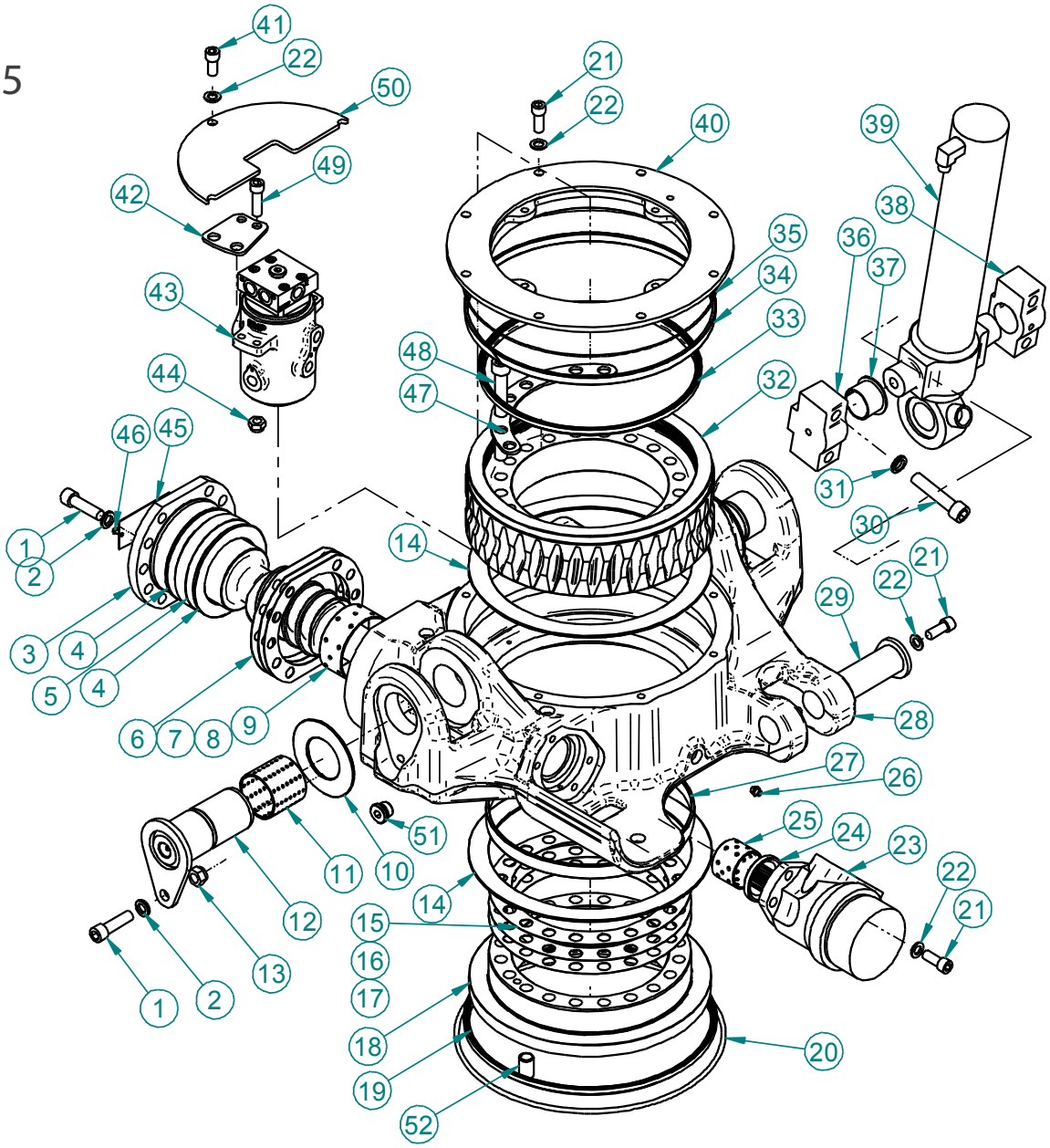


Pos.	Art nr.	Description
1	67257	ROTATOR HOUSING ST12
2	67265	AXIAL BEARING 306,5x245,5x3
3	67267	SLIDING RING 244,5x16,5x3
4	67225	WORM GEAR ST12
5	67230	SLIDING RING 316x10x3

6	67229	RELEASER DA17 250
7	67268-A	COVER ST12
8	67323	BUSHING COM 80/85X40
9*	67324	BEARING SCREW ST12
10	67215-A	WORM SCREW ST12
11	63148	CABLE GLAND 65x50x8
12	66193	RELEASER DA17 300
13	67270	BEARING SUPPORT
14	63896	SCREW 10.9 MF6S M10x20
15	67259	FRICTION PLATE ST12
16	67272	SHIMS thickness 0,2 mm
17	67273	SHIMS thickness 0,2 mm
18*	67322	BUSHING COM 50/55X50
19	67275	O-RING 115x2
20	63145	GUIDE PIN L 20x30
21	67276	O-RING 322x2
22	63992	BLEED NIPPLE M10X1
23	67277	O-RING 323x6
24	67278	O-RING 241x2
25	61295	NORDLOCK WASHER M14
26	63070	SCREW MC6S 12.9 M14x40
27	60753	LUBRICATION NIPPLE 1/8”
28*	60037	PIPE PLUG 1/2"
29	76821	TILT AXEL COMPL. ST12
30	61636	FRICTION PLATE 90/50,5x3
31	76731-A	COVERPLATE ST12
32	63221	HYDRAULIC MOTOR
33	60763	SCREW MCGS 12,9 M12x30
34	76705	CYLINDER AXLE COMPL.
35	67196	CYLINDER 63/32-326 ST10
36	76439	CAP,CYL MOUNT ST6
37	76730	SWIVEL HOLDER ST12
38	61688	SWIVEL ST
39	62955	WB 802 50/55x50
40	76791	WASHER SWIVELPLATE
41v	76729	WASHER ST12
42	63187	EMBLEM 95 x 45 GOLD
43	63191	SCREW MCS M5 x 8BRASS
44	61186	SCREW MC6S 12,9 M16x130
45	60099	NORDLOCK WASHER M10
46	60788	SCREW M6S 8.8 M12x30
47	60411	SCREW MC6S 10,9 M14x30
48	60754	NORDLOCK WASHER M12
49*	62890	PIPE PLUG 1 / 8"

SPARE PARTS

ST 15

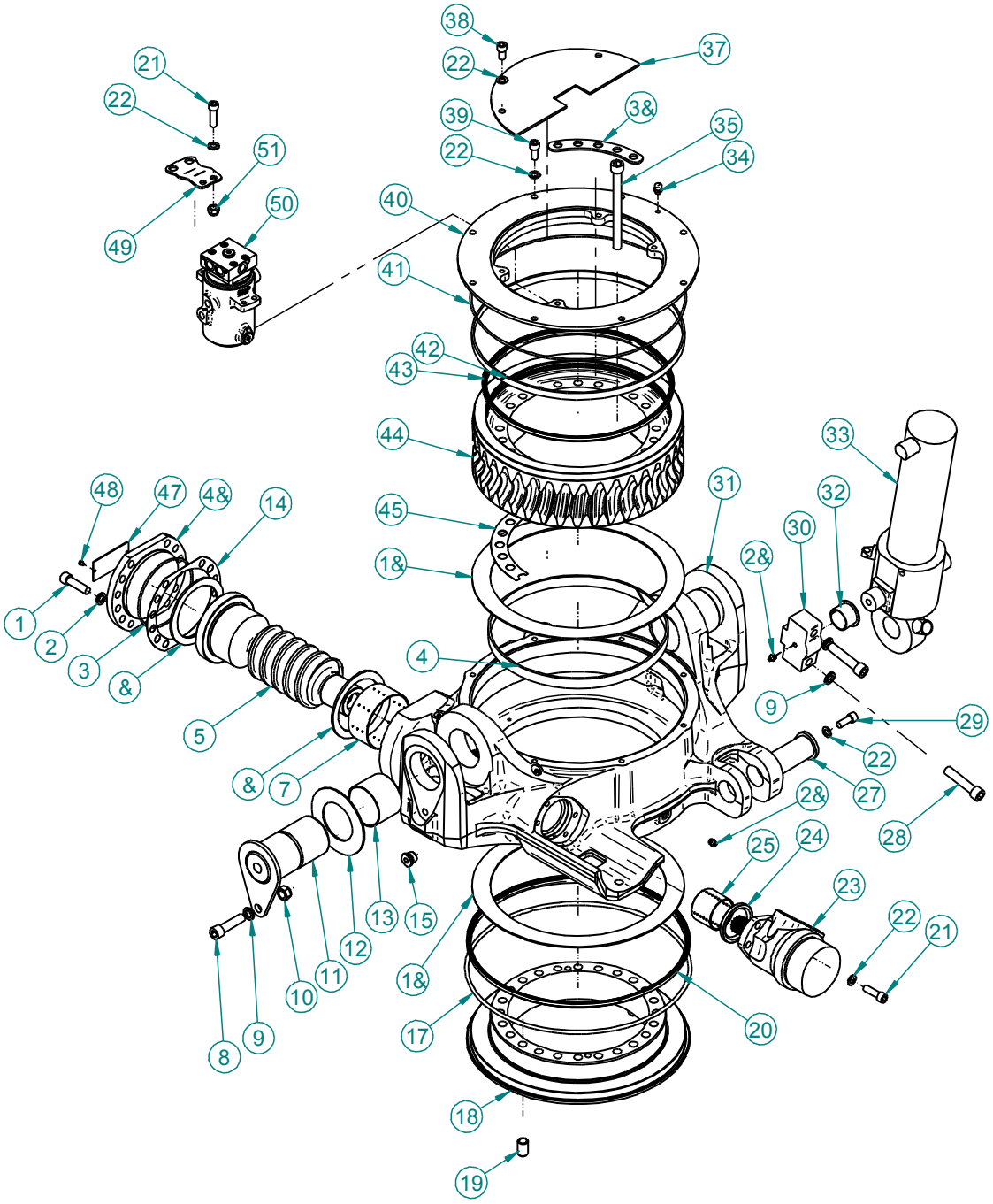


Pos.	Art.nr.	Description
1	63070	SCREW MC6S 12.9 M14 x 40
2	61295	NORDLOCK WASHER M14
3	63773	BEARING SUPPORT ST15
4	62976	FRICTION PLATE 134x95/4
5	63732-B	WORM SCREW ST15
6	63794	SHIMS T=0,2 ST15
7	63795	SHIMS T=0,5 ST15
8	63796	SHIMS T=1,0 ST15
9	63740	BUSHING WB802 90/95x40
10	63746	FRICTION PLATE 112x61/3 JM07

11	60603	BUSHING WB802 60/65x40
12	71390	TILT SHAFT CONNECTOR ST15
13	61201	SPLIT NUT LM6M M14 FZB
14	63734	SLIDING PLATE ST15
15	63793	SHIMS 267/208 T=1,0 ST15
16	63792	SHIMS 267/208 T=0,5 ST15
17	63791	SHIMS 267/208 T=0,2 ST15
18	63733-B	HUB ST15
19	63739	RELEASER DA17 320
20	63737	O-RING 350x6
21	60763	SCREW MCGS 12,9 M12 x 30
22	60754	NORDLOCK WASHER M12
23	63404	HYDRAULIC MOTOR EPMH-200-SHUP
24	63148	CABLE GLAND 65x50x8
25	63147	BUSHING WB802 50/55x40
26	60753	LUBRICATION NIPPLE R1/8"
27	63736	SLIDING RING 268x20x4 ST15
28	63730	ROTATOR HOUSING ST15
29	71388	CYLINDER AXLE COMPL. ST15
30	60373	SCREW MC6S 12.9 M16x75
31	60749	NORDLOCK WASHER M16
32	63731-A	WORM GEAR ST15
33	63738	RELEASER DA17 410
34	63735	SLIDING RING 324x12x4 ST15
35	63778	O-RING 315x2,5
36	59083	CAP CYL.MOUNT ST28/22/15
37	63428	BUSHING WB700 WF 40/44/54x30
38	71345	CAP CYLMOUNT ST15
39	63772	CYLINDER 63/32
40	63741-A	COVER ST15
41	63222	SCREW 12.9 M12x25
42	71539	SWIVEL HOLDER ST15
43	63764	SVIVEL
44	60084	SPLIT NUT LM6M M14 FZB
45	63187	EMBLEM 95 x 45 GOLD
46	63191	SCREW MCS M5 x 6 BRASS
47	71540	WASHER ST15
48	63055	SCREW MC6S 12.9 M16x140
49	60734	SCREW MC6S 12.9 M12x 40
50	71382	COVER ST15
51	60037	PIPE PLUG 3/8"
52	63145	GUIDE PIN L 20x30

SPARE PARTS

ST 22

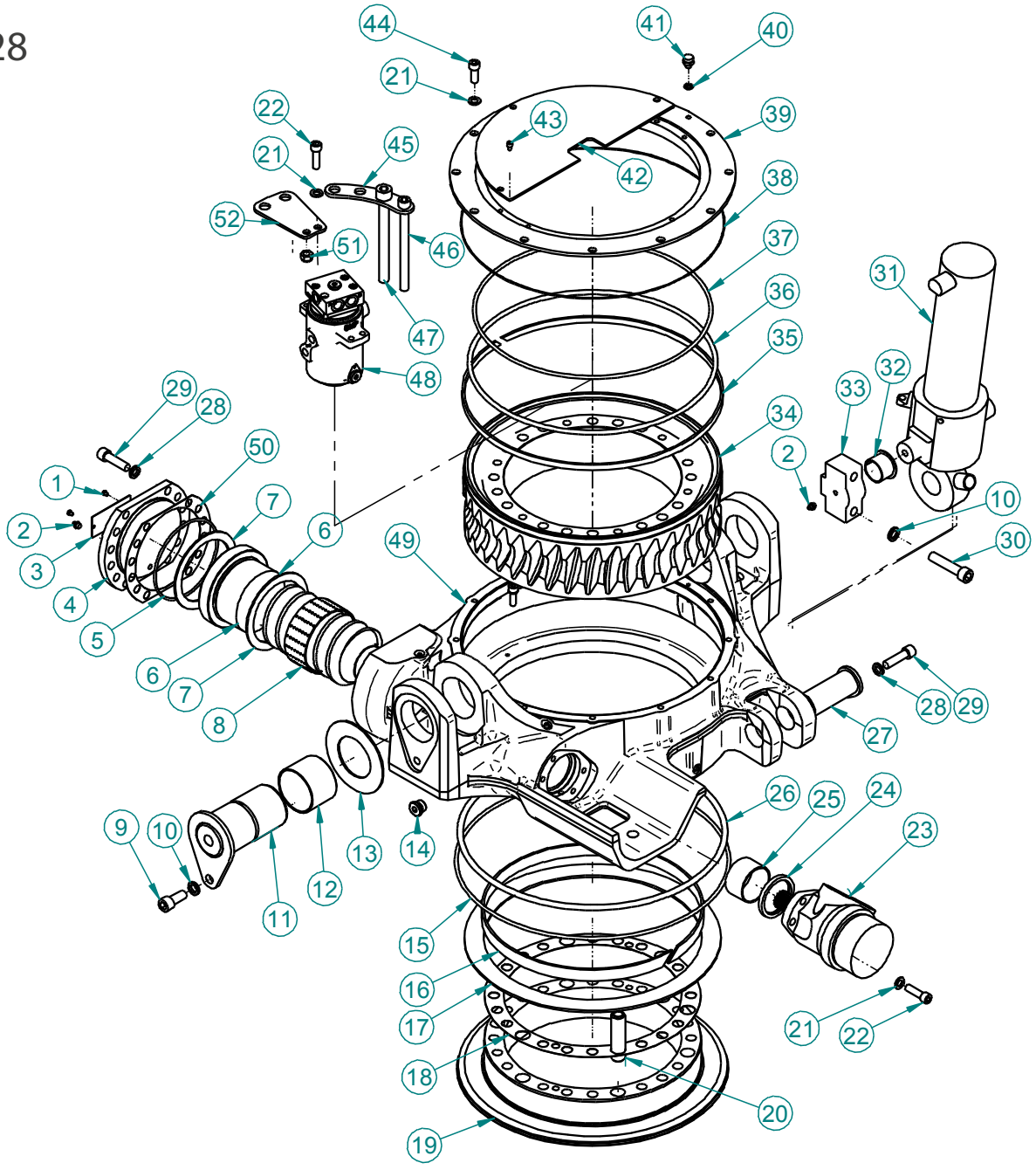


Pos.	Art.nr.	Description
1	63070	SCREW MC6S 12.9 M14 x 40
2	61295	NORDLOCK WASHER M14
3	65996	O-RING 139.29X3.53 (ORAR00254)
4	65787	SLIDING RING ST22 T=22
5	65782-B	WORM SCREW ST22
6	65785	SLIDING PLATE 140x100/4 JM07

7	63878	BUSHING WB702 110/115x50
8	60372	SCREW MC6S 12.9 M16x60
9	60749	NORDLOCK WASHER M16
10	61200	SPLIT NUT LM6M M16 FZB
11	71327	TILT SHAFT CONNECTOR ST22
12	63406	SLIDING PLATE 140x 80,50/3
13	63491	BUSHING WB700 80X85X60
14	65997	SHIMS ST22 BEARING SUPPORT T=0.2
15	60037	PIPE PLUG 3/8"
16	65784	SLIDING PLATE ST22
17	65793	O-RING 417,96x7
18	65783	HUB ST22
19	63145	GUIDE PIN L 20x30
20	65790	RELEASER DA17 410
21	60734	SCREW MC6S 12.9 M12x 40
22	60754	NORDLOCK WASHER M12
23	63404	HYDRAULIC MOTOR EPMH-200-SHUP
24	65788	CABLE GLAND 80x60x8
25	65791	BUSHING WB802 60/65x40
26	60753	LUBRICATION NIPPLE 1/8"
27	59088	CYLINDER AXLE COMPL. ST 21
28	60373	SCREW MC6S 12.9 M16x75
29	60763	SCREW MCGS 12,9 M12 x 30
30	59083	CAP CYL.MOUNT ST28/22/15
31	65796-B	ROTATOR HOUSING ST22
32	63428	BUSHING WB700 WF 40/44/54x30
33	63405	HYDRAULIC CYLINDER 80/50-425
34	62983	BLEED NIPPLE M10X1
35	63763	SCREW MC6S 12,9 M16 x 180
36	57702	WASHER ST22
37	71396	COVER ST22
38	61253	SCREW 12.9 M12x20
39	63222	SCREW 12.9 M12x25
40	65794	COVER ST22
41	65995	O-RING 405,26X3,53 (ORARA00282)
42	65786	SLIDING RING ST22 T=15
43	65789	RELEASER DA17 350
44	65781	WORM GEAR ST22
45	65144	SHIMS ST22 HUB T=0.2
46	65987	BEARING SUPPORT ST22
47	63187	EMBLEM 95 x 45 GOLD
48	63191	SCREW MCS M5 x 6 BRASS
49	71395	SWIVEL HOLDER ST22
50	63764	SWIVEL
51	60084	SPLIT NUT LM6M M14 FZB

SPARE PARTS

ST 28



Pos.	Art.nr.	Description
1	63191	SCREW MCS M5 x 6 BRASS
2	60753	LUBRICATION NIPPLE R1/8"
3	63187	EMBLEM 95 x 45 GOLD
4	58944	BEARING SUPPORT ST28
5	63360	O-RING 150X4
6	63350-B	WORM SCREW ST28
7	63355	SLIDING PLATE 150X120/3
8	63354	BUSHING WB802 120/125X50

9	60392	SCREW MC6S 12,9 M16x35
10	60749	NORDLOCK WASHER M16
11	59086	TILT AXLE COMPL. ST 28
12	63491	BUSHING WB700 80X85X60
13	63406	SLIDING PLATE 140x 80,50/3
14	60037	PIPE PLUG 3/8"
15	63359	O-RING 470X6
16	63347	SLIDING RING ST28 T=25
17	63352	SLIDING PLATE ST28
18	64011	SHIMS HUB ST28 T=0,5
19	63351-C	HUB ST28
20	63368	GUIDE PIN 25X95
21	60754	NORDLOCK WASHER M12
22	60734	SCREW MC6S 12.9 M12x 40
23	63404	HYDRAULIC MOTOR EPMH-200-SHUP
24	63361	CABLE GLAND 80X65X8
25	63353	BUSHING WB802 65/70X40
26	63357	O-RING 450/10
27	59088	CYLINDER AXLE COMPL. ST 28
28	61295	NORDLOCK WASHER M14
29	63070	SCREW MC6S 12.9 M14 x 40
30	60373	SCREW MC6S 12.9 M16x75
31	63405	HYDRAULIC CYLINDER 80/50-425
32	63428	BUSHING WB700 WF 40/44/54x30
33	59083	CAP CYL.MOUNT ST28/22/15
34	63349-B	WORM GEAR ST28
35	63346	SLIDING RING ST28 T=12
36	63358	O-RING 418X8
37	63370	O-RING 400X6
38	63369	O-RING 457 x 2
39	63885	COVER ST28
40	6221	RUBBER STEEL WASHER
41	63992	BLEED NIPPLE M10X1
42	72317	SVIVEL COVER ST28
43	63210	SCREW MC6S 12.9 M6x8
44	60763	SCREW MCGS 12,9 M12 x 30
45	92076	WASHER ST28
46	63510	SCREW MC6S 12.9 M14x180
47	63509	SCREW MC6S 12,9 M18x180
48	63764	SVIVEL
49	63390-C	ROTATOR HOUSING ST28
50	64013	SHIMS ST28 BEARING SUPPORT T=0,5
51	60084	SPLIT NUT LM6M M12 FZB
52	72138	SWIVEL HOLDER ST28

About SMP Parts

SMP is a leading designer and manufacturer of high quality equipment and tools for excavators and backhoe loaders. Our company prides itself on producing products and solutions that are of the highest quality and safety standards. We are a very customer focused company and by adapting our products, we can modify the solution for each customer's specific challenge or task at hand.

Since 1980 SMP Parts has been developing and producing equipment for mini excavators, tractor loaders and wheel drive/track drive excavators. Some of the products we offer are quick couplers, excavator buckets, grading buckets and a range of other accessories.

SMP's own patented quick hitch was launched in 1983 and in 1985 the Swingotilt® tiltrotator was developed.

In 1987 the AREMA GROUP AB took over the company and in 1989 SMP began selling to the Norwegian market.

In 1992 all manufacturing was moved to the present site in Ilsbo, Sweden and a year later a sales office in Germany opened.

SMP Parts have over 100 employees, most of which work at the factory in Ilsbo, Sweden but we also have employees in Norway and Germany.

SMP Parts operates in Sweden, Norway, Finland, Denmark, Germany, England, Spain and the Benelux countries, with a number of dealers in each country. All development and manufacturing is carried out in the main headquarters and factory in Sweden. To meet the requirements of quality, function and finish, SMP has over the years invested in a modern and efficient fleet.

Download a digital copy of this manual

Headquarters / factory

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Tiltrotator User Manual 67184-EN REV2015-12